Gravatt, Dan

From: Starman, Erika <erika.starman@testamericainc.com>
Sent: Monday, May 06, 2013 11:51 AM
To: Ms. Emily Fisher; Gravatt, Dan
Subject: Files from 160-2049-2 Characterization - Report
Attachments: J2049-2 UDS Level 2 Report Final Report.pdf

Good Morning,
Attached is the report for Job 160-2049-2. This is the Radium 226 component for samples collected on 4/9.
Regards,

Please let us know if we met your expectations by rating the service you received from TestAmerica on this project by visiting our website at: Project Feedback

ERIKA K STARMAN

TestAmerica St. Louis
THE LEADER IN ENVIRONMENTAL TESTING

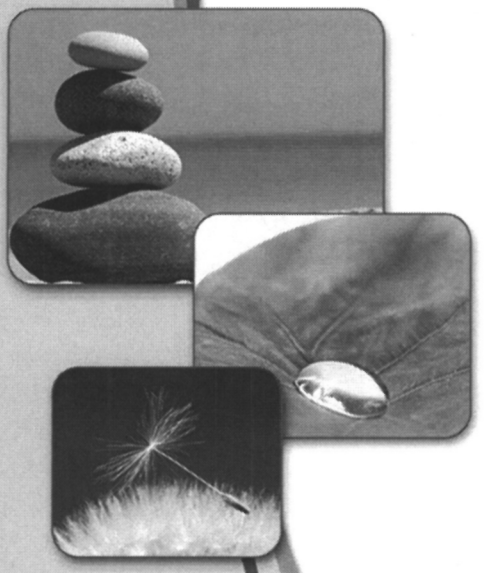
Tel: 314.298.566
www.testamericainc.com

Reference: [005763]
Attachments: 1

0714 40473115 3.0

Superfund

04-01



TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
Tel: (314)298-8566

TestAmerica Job ID: 160-2049-2
Client Project/Site: Characterization

For:
Tetra Tech EM Inc.
415 Oak Street
Kansas City, Missouri 64106

Attn: Ms. Emily Fisher

Authorized for release by:
5/6/2013 11:45:48 AM

Erika Starman
Project Manager I
erika.starman@testamericainc.com

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

Table of Contents

Job ID: 160-2049-2

Laboratory: TestAmerica St. Louis

Narrative

CASE NARRATIVE

Client: Tetra Tech EM Inc.

Project: Characterization

Report Number: 160-2049-2

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

TestAmerica St. Louis attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client."

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

RECEIPT

The samples were received on 4/9/2013 4:51 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 2 coolers at receipt time were 5.0° C and 6.0° C.

RADIUM-226 (GFPC)

Samples 2 (160-2049-1), 3 (160-2049-2), 1 (160-2049-3), 4 (160-2049-4) and 5 (160-2049-5) were analyzed for Radium-226 (GFPC) in accordance with EPA Method 903.0. The samples were prepared on 04/11/2013 and analyzed on 05/03/2013.

Radium-226 was detected in method blank MB 160-45566/1-A at a level that was above the method detection limit but below the reporting limit. Refer to the QC report for details.

No other difficulties were encountered during the Radium-226 (GFPC) analyses.

All other quality control parameters were within the acceptance limits.

Job ID: 160-2049-2 (Continued)

Laboratory: TestAmerica St. Louis (Continued)

TestAmerica St. Louis CUR 084
13715 Rider Trail North
Earth City, MO 63045
Phone (314) 298-8566 Fax (314) 298-8757

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Dan Gravatt / Horst	Lab PM: Starman, Erika K	Carrier Tracking No(s):	COC No: 160-313-149.1
Client Contact: Ms. Emily Fisher	Phone: 913 551 7324	E-Mail: erika.starman@testamericainc.com		Page: Page 1 of 2
Company: Tetra Tech EM Inc.				Job #:

Address: 415 Oak Street	Due Date Requested:	Analysis Requested	Preservation Codes:
City: Kansas City	TAT Requested (days): Standard TAT		A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2SO3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - ph 4-5, Z - other (specify)
State, Zip: MO, 64106			
Phone:	PO #: Purchase Order Requested		Other:
Email: emily.fisher@tetratech.com	WO #:		
Project Name: Characterization	Project #: 16001850		
Site: West Lake Landfill	SSOW#:		

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	A01R_U - Standard Target List	A01R_Th - Standard Target List	904.0 - Standard Target List	903.0 - Standard Target List	6010C, 7470A	8260C - OLM 4.2	Total Number of containers	Special Instructions/Note:
			Preservation Code:				D	D	D	D	D	A		
2	4/9/13	1230	G	W	N		X	X	X	X	X	X	8	Sample effervesed, VOC preservative lost maybe
3	4/9/13	1340	G	W	N		X	X	X	X	X	X	8	
1	4/9/13	1440	G	W	N		X	X	X	X	X	X	8	
4	4/9/13	1545	G	W	N		X	X	X	X	X	X	8	
5	4/9/13	1615	G	W	N		X	X	X	X	X	X	8	

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
[signature]	4/9/13 1651	EPA	[signature]	4/9/13 1651	TA
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.: | Cooler Temperature(s) °C and Other Remarks:

5/6/2013

Login Sample Receipt Checklist

Client: Tetra Tech EM Inc.

Job Number: 160-2049-2

Login Number: 2049

List Source: TestAmerica St. Louis

List Number: 1

Creator: Daniels, Brian

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	False	Refer to Job Narrative for details.
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Method Summary

Client: Tetra Tech EM Inc.
Project/Site: Characterization

TestAmerica Job ID: 160-2049-2

Method	Method Description	Protocol	Laboratory
903.0	Radium-226 (GFPC)	EPA	TAL SL

Protocol References:

EPA = US Environmental Protection Agency

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Sample Summary

Client: Tetra Tech EM Inc.
Project/Site: Characterization

TestAmerica Job ID: 160-2049-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-2049-1	2	Water	04/09/13 12:30	04/09/13 16:51
160-2049-2	3	Water	04/09/13 13:40	04/09/13 16:51
160-2049-3	1	Water	04/09/13 14:40	04/09/13 16:51
160-2049-4	4	Water	04/09/13 15:45	04/09/13 16:51
160-2049-5	5	Water	04/09/13 16:15	04/09/13 16:51

Detection Summary

Client: Tetra Tech EM Inc.
Project/Site: Characterization

TestAmerica Job ID: 160-2049-2

Client Sample ID: 2 — **Lab Sample ID: 160-2049-1**

No Detections.

Client Sample ID: 3 — **Lab Sample ID: 160-2049-2**

No Detections.

Client Sample ID: 1 — **Lab Sample ID: 160-2049-3**

No Detections.

Client Sample ID: 4 — **Lab Sample ID: 160-2049-4**

No Detections.

Client Sample ID: 5 — **Lab Sample ID: 160-2049-5**

No Detections.

This Detection Summary does not include radiochemical test results.

Client Sample ID: 2 — Lab Sample ID: 160-2049-1

Date Collected: 04/09/13 12:30 **Matrix: Water**
Date Received: 04/09/13 16:51

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	1.18		0.143	0.178	1.00	0.0584	pCi/L	04/11/13 13:16	05/03/13 07:12	1

Carrier	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Ba Carrier	97.1		40 - 110	04/11/13 13:16	05/03/13 07:12	1

Client Sample ID: 3 — Lab Sample ID: 160-2049-2

Date Collected: 04/09/13 13:40 **Matrix: Water**
Date Received: 04/09/13 16:51

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	1.24		0.141	0.180	1.00	0.0516	pCi/L	04/11/13 13:16	05/03/13 07:12	1

Carrier	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Ba Carrier	104		40 - 110	04/11/13 13:16	05/03/13 07:12	1

Client Sample ID: 1 — Lab Sample ID: 160-2049-3

Date Collected: 04/09/13 14:40 **Matrix: Water**
Date Received: 04/09/13 16:51

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	1.95		0.182	0.253	1.00	0.0524	pCi/L	04/11/13 13:16	05/03/13 07:12	1

Carrier	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Ba Carrier	104		40 - 110	04/11/13 13:16	05/03/13 07:12	1

Client Sample ID: 4 — Lab Sample ID: 160-2049-4

Date Collected: 04/09/13 15:45 **Matrix: Water**
Date Received: 04/09/13 16:51

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	2.01		0.187	0.260	1.00	0.0539	pCi/L	04/11/13 13:16	05/03/13 07:13	1

Carrier	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Ba Carrier	101		40 - 110	04/11/13 13:16	05/03/13 07:13	1

Client Sample ID: 5
Date Collected: 04/09/13 16:15
Date Received: 04/09/13 16:51

Lab Sample ID: 160-2049-5
Matrix: Water

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	2.73		0.208	0.322	1.00	0.0492	pCi/L	04/11/13 13:16	05/03/13 07:13	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*110*		*40 - 110*	*04/11/13 13:16*	*05/03/13 07:13*	*1*

Method: 903.0 - Radium-226 (GFPC)

Lab Sample ID: MB 160-45566/1-A
Matrix: Water
Analysis Batch: 49072

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 45566

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.06771		0.0415	0.0419	1.00	0.0528	pCi/L	04/11/13 13:16	05/03/13 07:11	1

Carrier	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*98.2*		*40 - 110*	*04/11/13 13:16*	*05/03/13 07:11*	*1*

Lab Sample ID: LCS 160-45566/2-A
Matrix: Water
Analysis Batch: 49072

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 45566

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Radium-226			11.2	11.46		1.11	1.00	0.0611	pCi/L	103	68 - 137		

Carrier	*LCS %Yield*	*LCS Qualifier*	*Limits*
Ba Carrier	*97.1*		*40 - 110*

Lab Sample ID: 160-2049-2 DU
Matrix: Water
Analysis Batch: 49072

Client Sample ID: 3
Prep Type: Total/NA
Prep Batch: 45566

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RER	RER Limit
Radium-226	1.24			1.525		0.211	1.00	0.0562	pCi/L			0.74	1

Carrier	*DU %Yield*	*DU Qualifier*	*Limits*
Ba Carrier	*103*		*40 - 110*

Rad

Prep Batch: 45566

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-2049-1	2	Total/NA	Water	PrecSep-21	
160-2049-2	3	Total/NA	Water	PrecSep-21	
160-2049-2 DU	3	Total/NA	Water	PrecSep-21	
160-2049-3	1	Total/NA	Water	PrecSep-21	
160-2049-4	4	Total/NA	Water	PrecSep-21	
160-2049-5	5	Total/NA	Water	PrecSep-21	
LCS 160-45566/2-A	Lab Control Sample	Total/NA	Water	PrecSep-21	
MB 160-45566/1-A	Method Blank	Total/NA	Water	PrecSep-21	

Tracer/Carrier Summary

Client: Tetra Tech EM Inc.
Project/Site: Characterization

TestAmerica Job ID: 160-2049-2

Method: 903.0 - Radium-226 (GFPC)

Matrix: Water

Prep Type: Total/NA

		Percent Yield (Acceptance Limits)
		Ba
Lab Sample ID	**Client Sample ID**	**(40-110)**
160-2049-1	2	97.1
160-2049-2	3	104
160-2049-2 DU	3	103
160-2049-3	1	104
160-2049-4	4	101
160-2049-5	5	110
LCS 160-45566/2-A	Lab Control Sample	97.1
MB 160-45566/1-A	Method Blank	98.2

Tracer/Carrier Legend

Ba = Ba Carrier